

REMARKS

In order to emphasize the patentable distinctions of applicant's contribution to the art, claim 1 has been amended to incorporate the limitation previously recited in dependent claim 4, namely the use of long length para-aramid or high density polyethylene reinforcing fibers in the bonded net or mesh used to reinforce the inner and outer surfaces of the helmet. Claim 9 has been amended to recite an improved helmet system, wherein the mesh or net of long length fibers disposed on the faces of the helmet molding cavity comprises long-length para-aramid or high density polyethylene reinforcing fibers. Claim 4 has been cancelled without prejudice.

Applicant's invention, as delineated by claims 1, 3, 5-9, 11, and 12, as amended, provides a helmet system that is strong, lightweight, and durable, yet provides increased protection to users engaged in contact sports. Many such activities, like football, entail body contact with large, impulsive forces experienced by both players. Improved protective equipment is urgently needed to protect the athletes, who have in recent years become bigger, stronger, and faster, only increasing the ferocity of their contact and the likelihood for serious, debilitating, or even life-threatening, injury. A given player may well experience several dozen significant contact events during even a single game, and several hundred such events over a year's season. Protective equipment such as helmets experiences repeated contact with the ground, as well as player-to-player contact. The equipment is also exposed to the elements during outdoor play. These factors make durability, both for aesthetic reasons and the need to maintain the required protective character, an essential feature of an ideal sports helmet.

Appreciation is expressed for the Examiner's withdrawal of the objection to the drawings under 37 CFR 1.83(a) and the rejection of claim 4 under 35 USC 112, second paragraph, which were made in the previous Office Action dated April 9, 2004.

Claims 1, 5, 6, 8, 9, 11, and 12 were rejected under 35 USC 103(a) as being unpatentable over Japanese Patent Document No. Hei 6-173110(A) to Suzuki et al., which discloses a helmet body structure.

The Examiner has pointed to paragraph [0017] of the English translation of Suzuki et al. and the helmet shell said to be defined by "organic fiber" with inner and outer surfaces reinforced with a bonded net or mesh of long length fibers (unidirectional fiber sheets) detailed in paragraphs [0012] and [0013].

Applicant respectfully observes that paragraphs [0012] and [0013] of Suzuki et al. recite unidirectional fiber sheets that comprise inorganic fibers said to be glass fibers adhered to the surface of body 1. Such fibers are clearly different from the fibers comprised in the bonded mesh or net which reinforces the inner and outer surfaces of applicant's helmet system. Instead of the inorganic fibers used by Suzuki et al., applicant's reinforcing fibers comprise long-length organic fibers, viz. para-aramid or high density polyethylene materials such as KEVLAR® or SPECTRA® fibers. Both these materials are known by a person of ordinary skill in the art to exhibit markedly different mechanical properties than the glass fibers disclosed by Suzuki et al. In particular, glass fibers do not exhibit high toughness, high cut resistance, or high abrasion resistance, each of which properties is, advantageously, present in KEVLAR and SPECTRA. Such properties of the reinforcing fiber required by applicant's claims, as amended, are highly beneficial in helmet reinforcement, particularly in enhancing the helmet's ruggedness and durability. As noted above,

helmets experience severe usage, during which cuts and abrasion are inevitable. Both KEVLAR and SPECTRA also exhibit far better mechanical properties -- namely, repetitive, high strain rate, impact loading events -- than does glass fiber. Such loading is precisely the form of mechanical abuse experienced by helmets used in contact sports, day in and day out. In the course of its ordinary and intended use, a helmet using glass fiber surface reinforcement, such as any helmet constructed in accordance with the disclosure of Suzuki et al., is far more vulnerable to degradation and loss of important mechanical properties resulting from the inevitable cuts, abrasions, and mechanical deformation, than a helmet reinforced with advanced materials such as KEVLAR and SPECTRA. Despite the commercial availability of KEVLAR since the 1970's, long before the filing date of Suzuki et al., and despite the recognition in Suzuki et al. that KEVLAR fibers are sometimes blended in helmet bodies (see, e.g., paragraph [0003], line 5), Suzuki et al. do not disclose or suggest the use of KEVLAR or any other organic reinforcing fiber for surface reinforcement. Instead, Suzuki et al. teach use of glass fiber, which is clearly an inorganic material. As amended, claim 1 (as well as claims 5, 6, 8, 11, and 12 dependent thereon) and claim 9 require long-fiber reinforcing net or mesh comprising para-aramid or high density polyethylene fiber. In light of the advantages afforded by the particular combination of materials and structural elements called for by applicant's claims, as amended, it is respectfully submitted that present claims 1, 5, 6, 8, 9, 11, and 12 patentably define over Suzuki et al.

Accordingly, reconsideration of the rejection of claims 1, 5, 6, 8, 9, 11, and 12 Under 35 USC 103(a) as being unpatentable over Suzuki et al. is respectfully requested.

Claims 3 and 7 were rejected under 35 USC 103(a) as being unpatentable over Suzuki et al. in view of US Patent 6,434,755 to Halstead et al., which provides a helmet including a

substantially rigid shell having a shell thickness defined by a substantially continuous exterior surface spaced apart from a substantially continuous interior surface.

As set forth hereinabove in connection with the rejection of claims 1, 5, 6, 8, 9, 11, and 12, applicant respectfully maintains that Suzuki et al. fails to disclose or suggest any helmet having the structure of applicant's helmet. In particular, Suzuki et al. do not teach a helmet having inner and outer surface layers reinforced with a fiber mesh or net comprising long-fiber para-aramid or high-density polyethylene fibers. Halstead et al. does not disclose or suggest any helmet having such fiber mesh or net reinforcement. Claims 3 and 7 depend from claim 1 and thus inherit all the features of claim 1, as amended. Applicant thus respectfully submits that claims 3 and 7 are patentable over Suzuki et al. and Halstead et al. for at least the same reasons as claim 1.

Accordingly, reconsideration of the rejection of claims 3 and 7 under 35 USC 103(a) as being unpatentable over the combination of Suzuki et al. and Halstead et al. is respectfully requested.

Claim 4 was rejected under 35 USC 103(a) as being unpatentable over Suzuki et al. in view of US Patent 6,499,147 to Schiebl et al., which discloses protective headgear. As set forth hereinabove, claim 4 has been cancelled and its subject matter incorporated into amended claim 1. The rejection of claim 4 will thus be discussed with reference to amended claim 1.

The Examiner has recognized that Suzuki et al. do not teach forming the net or mesh of para-aramid fibers as claimed. Although not expressly acknowledged by the Examiner, applicant further submits that Suzuki et al. does not disclose or suggest high-density polyethylene fibers as also delineated by amended claim 1. The Examiner has thus proposed combining Suzuki et al. with

Schiebl et al. Specifically pointing to col. 3, lines 21-40, the Examiner has alleged that Schiebl et al. teaches the use of KEVLAR fibers as being old.

Applicant respectfully submits that the proposed combination is not proper, because Schiebl et al. expressly teaches away from any helmet having the polymeric helmet shell of applicant. In particular, Fig. 1 of Schiebl et al. depicts a helmet which has an inner layer 12 and an outer layer 14 permanently bonded to an inner rigid foam core 16 to form a rigid shell of relatively light weight." Col. 3, lines 25-27, emphasis added. Schiebl et al. specifically denotes element 16 as being an "inner rigid foam core" at col. 3, line 27, within the passage cited by the Examiner. Schiebl et al. goes on to teach away from any helmet lacking an inner foam core. ["The core which is preferably made of polyethylene foam is important to the performance requirements. Although it may be possible to produce a shell of either a single composite layer, or multiple composite layers, without the light weight foam core spacing the inner and outer layers, the deflection properties of these shells would not match those of the laminated core shell when weight of the shell is considered." See col. 3, lines 43-50, emphasis added, of Schiebl et al.]

That is to say, Schiebl et al. teaches use of an inner foam core to increase rigidity of the helmet shell. By this means Schiebl attempts to avoid damage, such as cracking, to the helmet shell caused by high impact loading. In contrast to the Schiebl teaching, Suzuki et al. discloses a helmet body structure clearly lacking any inner foam core. Instead, the helmet body is impregnated with liquid resin after formation in a mold. Paragraph [0017].

The Federal Circuit has ruled it improper to combine references in an obviousness rejection when one reference teaches away from combination with another reference. *In re Rudko*,

194 F.3d. 1336, 1999 WL 319508 (Fed. Cir. 1999). Applicant respectfully submits that this finding makes the proposed combination in the instant matter improper.

Accordingly, reconsideration of the rejection under 35 USC 103(a) of claim 4 over Suzuki et al. in view of Schiebl et al. is respectfully requested.

In view of the amendment to claims 1 and 9; the cancellation of claim 4; and the foregoing remarks, it is submitted that the present application, as delineated by claims 1, 3, 5-9, 11, and 12, as amended, is in allowable condition. Entry of the present amendment, reconsideration of the rejection of claims 1, 3-9, 11, and 12, and allowance of this application are, therefore, earnestly solicited.

Respectfully submitted,

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